

### Abstract

A calcium-promoted alumina supported nickel reforming catalyst stabilized with titanium is disclosed. The catalyst is particularly useful for reforming reaction in feed streams containing significant quantities of CO and CO<sub>2</sub>, low quantities of steam (the feed stream having a H<sub>2</sub>O/CH<sub>4</sub> of less than 0.8 and a CO<sub>2</sub>/CH<sub>4</sub> of greater than 0.5) and relatively high quantities of sulfur compounds (up to about 20 ppm). The catalyst comprises from about 25 wt% to about 98 wt % alumina as a support, from about 2 wt% to about 40 wt% nickel oxide, which is promoted with from about 0.5 wt% to about 35 wt% calcium oxide, and which is stabilized with from about 0.01 wt% to about 20 wt% titanium, wherein the calcium oxide is combined with the alumina to form calcium aluminate.

The catalyst can be used in reforming reactions to produce syngas and has advantages in producing low hydrogen to carbon monoxide ratio syngas for applications such as iron ore reduction.